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Interactive Teachers' Network: Technological Support for Teacher Professional Development

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Abstract

As technology is transforming the way that people work, communicate, and learn, schools and teachers must accommodate and adapt to these rapidly changing conditions. How to prepare teachers adapting to change is an important focus of the current wave of educational reform. In particular, traditional methods of teacher training has often been criticized for its profound disconnection between theory and practice. To bring about educational reform, reframing the conception of teacher professional development is essential. In this paper, we describe the technological support and design for an online teachers' network which provides new mode for delivering sustainable lifelong teacher professional development and demonstrates the potential for developing adaptive teachers through collaboration and reflection within a virtual community of practice.

Keywords: community of practice, teacher network, teacher education, learning community

Introduction

As our society is adapting to the rapid changes brought by the Information Revolution, education must also accommodate and adjust its curriculum and pedagogy to meet the new demands of the information age. Learning goals move away from remembering and reproducing facts towards the ability to think critically and integrally and reflectively and to solve problems independently and collectively. In particular, knowledge is now dynamically constructed instead of statically transmitted. As society and schools transform, the role of the teacher has also been evolving. With the exponential growth of information and its multimedia availability, teachers' role as sources of knowledge for their students is becoming obsolete. Reframing conceptions of teaching, learning, schooling as well as teacher professional development is thus essential.

In the wave of education reform, the centrality of the role of teacher professional development is undisputed. The delivery of the social constructivist form of learning pivots on the personal and professional growth of teachers. To create a reform-based

classroom where curricular changes and pedagogical innovations are best coordinated, teachers need to adopt a receptive attitude and gain contextualized competence in meeting the new demands of the teaching and learning. Teaching effectiveness (including successful implementation of innovative programmes and student achievement) are molded by a network of factors, such as teachers' belief in their ability to affect student performance, teachers' locus of control and teachers' learning approach. Studies have shown that teachers with higher efficacy beliefs are likely to engage in more productive teaching practices (Gordan et al. 1998). It cannot be denied that teachers face daunting challenges as they adapt their classroom to the multifaceted demands of the society, school, parents, students. To uphold teachers' confidence, enhance morale and create cohesiveness in the teacher community is a task not to be neglected.

Moreover, in response to the growing impact of the changing environment, teachers' continuous learning and adaptation are critical elements in the pursuit of teacher effectiveness. It is important that teacher professional development pinpoints the necessary knowledge and competence that will help teachers analyze and reflect on environmental changes and develop appropriate strategies to make continuous improvement and development. For teachers to help students learn and develop, they themselves need to be engaged in lifelong learning and persistent professional development. The purpose of teacher professional development, in addition to enhancing teachers' professional skills and knowledge, is to promote adult learning and propel further development for teachers. Nevertheless, traditional methods of teacher professional development have often been criticized for its profound disconnection between theory and practice in teacher education programs and teachers are trained by outside experts rather than participating in their own development (Roddy 1999). Unrelated to classroom contexts and teaching practice, government authorities tend to create "one size fits all" solutions that often fail to make distinctions among different kinds of school and classroom contexts, or between the needs of novice and experienced teachers (Lieberman 2000). They thus have difficulty in responding to the fast changing conditions and the needs of schools, teachers and students.

As any other form of experiential learning, the professional development of teachers critically involves experience and also a systematic approach to learning involving reflection, conceptualization and planning. In this way, the new experience will be informed by learning from the past and from the experience of others. The building of a community of practice is critical in teacher education. By utilizing computer mediated technologies, teachers are capable of creating collaborative environments and building up their own communities of practice that grow and evolve with their participants.

Characteristics of Teacher Professional Development

Traditional teaching training is usually carried out by means of formal short-term courses to provide teachers with opportunities to refresh and update their knowledge of the developments and implementations of innovative curricular design and pedagogical practices. Teachers are then expected to bring back to their classrooms what they have

acquired during the training. But when teachers exit the formal training courses and return to the real students in the real classrooms, the channel for resource exchange, knowledge communication and peer support has already been terminated and teachers are on their own again. Traditional teacher training is segregated from the day-to-day work of teachers and is therefore limited in its utility, vitality and impact.

Teaching by its nature does not necessitate and facilitate communication among colleagues. But teaching professionals are in urgent need of ongoing communal support through informal channels of communication for both community building and knowledge construction. Teachers not only need to overcome isolation from other teachers and share experience and resources with peers in an environment equipped with tools for professional discourse, they also need equal access to teacher training opportunities and ongoing support for the change process. Recognition and rewards for their efforts will also serve as an impetus for innovative practices (Schalger and Schank 1997). In other words, teacher training should be placed in the context of teacher's daily experience and participation both inside and outside classrooms. Teaching professionals need to establish a community of practice where learning takes place in a social environment enhanced by sociocultural scaffoldings and knowledge management tools. In "Community of Practice: The Social Fabric of a Learning Organization" (Wenger 1996), Wenger puts forth seven principles of learning upon which the social fabric of a learning organization is based. First he claims that learning is inherent in human nature and is implicit in all human activities. What is needed is not to create learning, but rather to create circumstances that make learning empowering and productive. Second, the author argues that learning is fundamentally social and thoroughly integrated in social participation. The social world is therefore a rich resource essential to learning and there is no distinction between learning and social participation. Third, Wenger proposes that learning changes our ability to participate in the world and therefore transforms our self-perceptions and identities as social beings in different contexts. Fourth, learning is defined as engagement in practice, a concrete competence to participate in socially defined activities and to contribute to a community and its enterprise. Fifth, in communities of practice, knowing, belonging and doing are not separable: What we know, who we are and what we do seamlessly come together in the experience of participation that encompasses the past and open the future, deepening existing knowledge while creating new knowledge. Sixth, Wenger encourages collaboration among communities of practice and suggests that boundaries are often places where new communities are created. Lastly, the interplay between the local and the global in learning is emphasized and contexts of practices encouraged to broaden.

Building, maintaining and expanding a community of practice for teachers is therefore the key for mediating transformative, sustainable and scaleable teacher professional development and for extending the scope of teacher training to become a more integral part of a teacher's career. A community of practice for professional development is bound by a common sense of purpose and the need to know what each other knows. It is a community that learns, evolves practices and jointly develops innovative practices. Newcomers and journeymen interact in the authentic context of work. Through a professional hierarchy toward expertise, economies of scale, diversity

and informal communication channels, the community grows organically, builds knowledge and attains expertise (Schlager et al. 1999).

Moving Towards On-line Education Community of Practice

The great advancement in information and communication technology has made possible an online community of practice that brings together a large number of teachers and incorporates teacher training activities flexibly into their busy schedules, while making use of social scaffoldings and cognitive tools to share and create communal knowledge. In general, these virtual learning communities have a shared purpose, social norms and multiple roles among its members, ongoing activities, a critical mass of users with persistent identities, a public venue for recognition of performance, an archive of prior interactions and contributions and also social support for peripheral participation or lurking (Schlager et al. 1997). Creating, sustaining and scaling an online community of practice for teacher professional development is as, if not more, difficult as building and maintaining a physical community. Besides the vision to practice teacher training as a lifelong process that occurs in the context of daily practice and beyond individual projects and organizations, the cornerstone of such an online learning community is technological support. In particular, an integrated set of collaborative and cognitive tools that can enhance a seamless work environment for teachers will play a major role in determining the success of such an online community.

Interactive Teachers' Network: Design Concepts and Architecture

Interactive Teachers' Network (ITN) envisages an online community of teachers that promotes teacher professional development. Through social participation and collaboration, teachers can develop agendas sensitive and relevant to their personal and collective development. Researchers with the Apple Classroom of Tomorrow (ACOT) Project observed that educational change and professional growth are accelerated in contexts where teachers work as teams and engage in reflective, collegial pattern of work (Hruskocy et al. 2000). We thus anticipate that change or transformation of educational praxis will occur if teachers can engage themselves persistently in collaboration and reflection within their community of practice.

ITN is a community-building environment designed to support virtual education communities of practice and to help them thrive and grow. ITN is not merely an environment supported by computer mediated communication technology, it provides both cognitive scaffoldings as well as social scaffoldings (Kim 1998) which enables teachers to become progressively more involved in the community and to sustain their commitment and interests. In each community or group, the expertise is distributed across participants; individuals are free to specialize in particular skills or domains of knowledge and become mentors and experts in those areas. The mentors are expected to assume the responsibilities of providing supports to newcomers and novice teachers. With the provision of such a collaborative and supportive social structure, participants

can develop mutual respect for each other as they take on leadership roles and assist each other within and across groups or communities. Each participant therefore has a well-defined role, social identity within the community. ITN allows its members to edit or update their personal profiles. This feature provide opportunity for each individual to redefine their roles and create a progressively more detailed profile as their participation in the group deepens, thus making the community dynamically evolve. Members can participate in a variety of activities such as real-time virtual conferencing, online professional development courses, searching and sharing of educational resources, conducting research or expanding their collegial circle by participating in community-wide events.

System Architecture

ITN comprises five key elements, namely, Professional Development Centre, Resource Centre, Communication Centre, Collaboration Centre and Personal Organizer, which form the backbone of the environment. Technically, ITN is a client/server application built upon Java Applet, Servlet and Java Server Page technologies. Thus, ITN by its nature is a portable community-building suite and can be deployed to various platforms. Coupling with a backend SQL server through ODBC/JDBC connection, the system is capable of handling a large number of concurrent processes. Specific adapters are developed to facilitate the exchange of data with external proprietary databases used in other courseware such as WebCT and LotusNotes. ITN is highly extensible and scalable. With the adoption of object-oriented approach to system development, new functions, features or services can easily be added and implemented. Since Java Technology is designed for handling mass distributed processing, the system can be scaled up to manage a vast number of concurrent users without any difficulty.

Resource Centre

The resource centre serves as the central knowledge repository of the environment. Teachers can upload or download lesson plans, teaching ideas, educational resources and software or share their favourite web sites. For each item listed in the centre, participants can rate or rank it according to its quality or post their comments to the threaded discussion forum attached to each listed item. This mechanism enables teachers to share among themselves their successful stories and innovative practices. The database structure is deliberately designed to support 'multiple perspectives' in organizing and categorizing information, documents and resources. For instance, the uploaded resource items can be listed according to dates, rating, authors, groups or communities, subject areas, or courses offered by the professional development centre. Members are free to add on new categories, thus making the knowledge base customizable and dynamically growing. The centre also provides outreach to external popular educational resource sites and express news about activities and events held by other teacher networks, thus broadening the scope of ITN member's participation in a worldwide community of practice.

Professional Development Centre

The vitality and impact of traditional teaching training, as discussed in previous section, is limited by its lack of channel for persistent resource exchange, knowledge communication and peer support when teachers exit the formal training courses. The professional development centre in ITN serves as an augmentation to formal teacher training. It provides an integrated environment for course participants to browse on-line course materials, to exchange ideas and to share resources. The professional development centre consists of a number of virtual course rooms. Each course room is designated to a particular real-life face-to-face teacher professional development course. The types of programs offered range from refreshment courses to master programs. Within each course room, participants are provided with a set of tools for communication and collaboration.

In most of the web communities, the community experience and human relationships can only be kept on-line. However, as people deepen their participation in the virtual space, it becomes increasingly important to integrate the online community experience with the traditions and rituals of the real world in order to help the community to grow and flourish (Kim 1998). As ITN is built upon existing real-life human networks derived from course participants and bodies from the education profession, it thus provides a sound base for developing successful on-line communities.

Collaboration Centre

The collaboration centre is structured around the metaphor of virtual workspaces and meeting places. In each of these virtual premises, it contains a set of shared objects such as documents, tools, and other work artifacts that can support collaborative work. It integrates into a single environment with whiteboards, chat facilities, screen- and application-sharing tools, and customizable knowledge management agents such as calendars, collaborative concept mapping tools, bulletin boards, threaded discussion forums and databases. As in real-life workplace, an individual or a group can maintain an office and customize its settings to tailor for their own work. If several people occupy a room at the same time, they can engage in synchronous collaboration. By making use of the conference scheduler, each group can also schedule their real-time virtual conferencing, which is useful when there is a need for decision making. If a room is occupied by a single person, one can work alone and possibly leave information for those who enter the room in later sessions. When people leave the room, All the settings will remain intact. Thereby, in addition to synchronous collaborative work, the environment can also support 'any-time' (asynchronous) collaboration, making long term project work sustainable.

In addition to the existing groups and communities derived from various professional training courses and research projects, the collaboration centre provides facility for building new communities. ITN members are eligible to propose and register a new group and recruit collaborators. Upon registration, the proposer is required to submit a brief mission statement, defining the purposes and expectations of the group. Any ITN member is free to subscribe to a new group. As the group grows, the statement

can be modified and developed into a more matured one, articulating the shared visions and goals among group members. Effective leadership plays a pivoting role in making the group thrive (Nonis et al. 2000). Each group is thus required to nominate a person as the group leader to encourage collegiality, facilitate meaningful interaction between members and resolve conflicts as needed. Within the ecology of ITN, each group or community has a life cycle. Small groups can grow and multiply or merge into a large community while a large community can break up into small groups. This mobile structure provides great flexibility for each community or group to grow and evolve.

Conclusion

The failure of traditional teacher professional development hinges upon the profound disconnection between theory and practice and the lack of channel to sustain resource exchange, communication and collegial support. Teachers have been considered as passive receivers of prescriptive programs, given little time or incentive to integrate these new programs into their classroom practice. ITN, in contrast, provides supportive social structures and involves members in a variety of activities that reflect the purposes and changing needs of their participants. Teachers can engage themselves in real-time or 'any-time' collaboration persistently. Through dialogues, collaborative work and reflection, teachers are provided with opportunities to construct their own knowledge. Teachers become members of a community where they are valued as partners and colleagues. ITN thus provides a new framework for sustainable and scalable teacher professional development that goes beyond the traditional paradigm of teacher education.

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